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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,163	12/12/2001	Xiaosong Wu	440505/PALL	1836
23548	7590	10/03/2003	EXAMINER	
LEYDIG VOIT & MAYER, LTD 700 THIRTEENTH ST. NW SUITE 300 WASHINGTON, DC 20005-3960			KIM, SUN U	
			ART UNIT	PAPER NUMBER
			1723	

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/914,163

Applicant(s)

WU ET AL.

Examiner

John Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-86 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15, 17, 18, 22, 24-32, 34, 35, 43, 46 and 50-85 is/are rejected.
- 7) ☒ Claim(s) 16, 19-21, 23, 33, 36-42, 44, 45, 47-49 and 86 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 121201 6) ☐ Other:

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1. Information disclosure statement submitted on 12/12/01 has been considered by the examiner.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 11, 15, 17-18, 25-27, 29-32, 50-51, 58, 60-63, 65-71, 74-77 and 79 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,601,828 (hereinafter referred to as Gershoni '828). Gershoni '828 teaches a positively charged microporous membrane and method of preparing the hydrophilic cationic modified membrane comprising a hydrophilic porous membrane including nylon membrane i.e. polyamides and a cationic charge modifying agent coated thereon wherein a cationic modifying agent comprising a water soluble organic polymer of monomers having at least one epoxide group capable of bonding to the surface of membrane and at least tertiary amine or quaternary ammonium groups including polyamido-polyamine epichlorohydrin resin, a polyamine epichlorohydrin resin, or a resin based upon diallylnitrogen-containing materials reacted with epichlorohydrin (see col. 8, line 57 – col. 9, line 10; col. 9, lines 46-51; col. 10, lines 38-42; col. 11, line 26 – col. 13, line 6; col. 13, line 35 – col. 14, line 18; col. 17, line 1 – col. 19, line 52)(claims 1-5, 11, 15, 17-18, 25-27, 31-32, 50-51, 60-63, 65-66, 75-77, 79). Gershoni '828 further teaches a secondary charge modifying agent which is an aliphatic amine having at least one primary amino or at least two secondary amino groups including tetraethylene pentamine or an aliphatic amine having at least one secondary amino group and a carboxyl or hydroxyl substituent (see col. 9, lines 10-16; col. 12,

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lines 42-68)(claim 32). Gershoni '828 further teaches that the charge modifying agent can also be an aliphatic amine or polyamine bonded to the membrane through a cross-linking agent which is an aliphatic polyepoxide having a molecular weight of less than about 500 including 1,4-butanediol diglycidyl ether (see col. 9, lines 17-20; col. 19, lines 38-52)(claims 50, 58).

Gershoni '828 further teaches that the hydrophilic charge modified membrane has a capacity for binding protein of at least 480 microgram per square centimeter wherein protein includes bovine serum albumin and 3000 cpm nucleic acids are bound to the membrane (see col. 15, lines 57-60; col. 16, lines 15-21; col. 21, line 40 – col. 23, line 13)(claims 29-31, 67-71, 74).

4. Claims 1-4, 10-11, 24, 26-28, 50-52, 66-71, 75-76 and 79 are rejected under 35

U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,151,189 (hereinafter referred to as Hu et al.). Hu et al teach a positively charged microporous membrane and the method of preparing the membrane comprising a hydrophilic porous membrane including hydrophilically modified polyethersulfone membrane and a cationic charge modifying agent coated thereon wherein a cationic modifying agent comprising a polyethyleneimine-epichlorohydrin modified resin having quaternary ammonium group (see col. 3, line 30 – col. 5, line 56; col. 7, line 10 – col. 9, line 51)(claims 1-4, 10-11, 24, 26-28, 50-52, 66, 75-76, 79). Hu et al further teach that the hydrophilic charge modified membrane binds nucleic acids (see col. 12, line 48 – col. 14, line 2)(claims 67-71).

5. Claims 1-12, 15, 17-18, 22, 25-29, 31-32, 35, 43, 46, 50-53 and 61-83 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,407,581 (hereinafter referred to as Onodera et al). Onodera et al teach a positively charged microporous membrane and the method of preparing the membrane comprising a hydrophilic porous membrane including polysulfone

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membrane and a positive functional groups bonded thereon wherein positive function groups comprise amines and amine derivatives e.g. tertiary and quaternary amino groups including polyethyleneimine, diallylamine copolymer such as diallylamine and 2-hydroxyethylacrylate, acrylic copolymer such as diethylaminoethyl methacrylate and 2-hydroxyethyl acrylate wherein positive functional groups are introduced onto the surface by hydroxyl or amido group wherein the charge modified membrane binds protein, nucleic acids and antibody (see col. 4, line 49 – col. 5, line 9; col. 11, line 14 – col. 13, line 22; col. 28, line 67 – col. 29, line 2; col. 29, line 33 – col. 30, line 7; col. 38, line 34 – col. 39, line 65; col. 46, lines 41-66; col. 49, lines 7-35)(claims 1-12, 15, 17-18, 22, 25-29, 31-32, 35, 43, 46, 50-53, 61-83).

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 13-14, 24, 34, 54-57 and 84-85 rejected under 35 U.S.C. 103(a) as being unpatentable over Onodera et al as applied to claims 12, 32, 52, 53 and 80 respectively above, and further in view of U.S. Patent No. 5,780,616 (hereinafter referred to as Fornasari et al).

Onodera et al teach a positively charged microporous membrane and the method of preparing the membrane as described in above paragraph. Claims 13-14, 54-55 and 84-85 essentially differ from the membrane and the method of preparing the membrane in reciting that positively charged group is linked through a claimed spacer group including hydroxyalkyl moieties.

Fornasari et al teach that cationic polymer is formed by introducing quaternary ammonium group with 3-chloro-2-hydroxypropyl-N, N, N-trimethylammonium chloride which introduces a spacer,

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hydroxypropyl, to the treated polymer (see col. 3, line 23 – col. 5, line 14). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to introduce a positive charged group such as quaternary ammonium group to the membrane of Onodera et al via known agent having a spacer including hydroxyalkyl group. Regarding claims 24, 34 and 56-57, Fornasari et al teach a quaternary ammonium introducing agent including a glycidyl trimethylammonium chloride (see col. 4, lines 58-62).

8. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gershoni '828 as applied to claim 58 above, and further in view of U.S. Patent No. 5,707,741 (hereinafter referred to as Hoenele et al). Gershoni '828 teaches a positively charged microporous membrane and method of preparing the hydrophilic cationic modified membrane as described in above paragraph 1. Claim 59 essentially differs from the method of Gershoni '828 in reciting that the coating is crosslinked by a polyalkyleneglycol polyglycidyl ether. Gershoni '828 teaches that secondary charge modifying agent is crosslinked with a polyepoxide crosslinking agent such as 1,4-butanediol diglycidyl ether solution (see col. 13, line 34 – col. 14, line 18; col. 19, lines 39-46). Hoenele et al teach the application of polyepoxides as polyamine crosslinking component including polyglycidyl ethers on aliphatic diol or polyalkylene glycols (see col. 7, lines 12-23). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to substitute polyalkyleneglycol diglycidyl ethers for alkanediol diglycidyl ethers in the method of Gershoni '828 as an equivalent polyamine crosslinking component.

9. Claims 16, 19-21, 23, 33, 36-42, 44-45, 47-49 and 86 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Kim whose telephone number is (703) 308-2350. The examiner can normally be reached on weekdays from 7:00 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker, can be reached on (703) 308-0457. The fax phone number for official response is (703) 872-9306.

When sending a draft amendment by fax, please mark the paper as "DRAFT"; otherwise, mark the paper "OFFICIAL". This will expedite the processing of the paper.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0651.

  
**John Kim**  
**Primary Examiner**  
**Art Unit 1723**

J. Kim  
September 26, 2003